A desk (9) for supporting an electronic apparatus having a VDU (54) and desk system formed by interconnecting a plurality of such desks or as a separate unit is provided. Each desk either individually or as a common means has means for moving at least a VDU of said electronic apparatus from a first in use position above a plane of a desk work surface to a second, stowed position below the plane of the work surface. The support means (51) may be moved manually or is motorised. The monitor may be housed in a chassis (30) or framework. The desks may be linked with connectable power or network cables (36). A plurality of monitors and electronics devices (45) may be provided on each desk. The desk may also function as a conference table. When in the stowed position the monitor covers (9) serves as an additional work surface.

Fig. 5
A Desk and A Desk System For An Electronic Apparatus Having a Screen

The present invention relates generally to a desk for supporting an electronic apparatus having a visual display unit (VDU) such as a personal computer (PC) and other like electronic devices and to a desk system comprising a plurality of such desks interconnected to provide a desk system. More specifically, the present invention relates to a dual purpose desk for supporting a PC and associated peripheral devices and to a desk system formed therefrom.

Desks for supporting PCs are well known. A typical computer desk comprises a main desktop on which is placed a VDU viewable by a user seated at the desk. Often such desks have at least one drawer slidably mounted below the main desktop for use in carrying a computer keyboard and a stand or secondary desktop mounted on and towards the rear of the main desktop which carries the VDU at a more convenient height for viewing by the user. Such a desk may even include a drawer or rack for accommodating the PC (central processing unit apparatus) in order to hide it from view rather than locating it on the desktop or on the floor adjacent or under the desk as is usual.

Where a series of desks are used, for example in an office or a classroom, to support a number of networked PCs, each desk generally comprises a separate unit having power and electrical/signal cabling separately routed to it from conveniently located power and cable connection points. Many of these desks will often be placed side-by-side or otherwise adjacent one another.

Existing computer desk systems require (i) power cabling to the PCs and various computer peripheral devices such as VDUs, printers and scanners, (ii) cabling between the respective PCs and peripheral devices, and between various peripheral devices themselves, (iii) modem or local area network (LAN) connections for Internet access, and, in some cases, (iv) network cabling connecting the PCs to each other to form a network.

Various attempts have been made to rationalize the manner in which such cables are routed to and between the PCs and peripheral devices. Commonly used systems for
dealing with these cables include tying them together with plastic cable ties, string, or plastic “Cable Zip” tubes. Where the cables cross the floor from desk to desk or from cable and power outlets to the desks they are often taped to the floor, placed under rubber cable protectors that form ridges on top of the floor, or are placed in trunkways under the floor. Loose cabling and the currently used cable tidying systems can be unsightly and may even be dangerous. Also, the cabling is subject to damage through being trapped between desks and/or the desks and walls or through people tripping over it or walking on it. It is also affords easy access for unauthorized purposes. Installing trunkways in floors is expensive since such trunkways must be carefully laid out with the relevant connection points being located precisely for each desk. Each connection point is expensive to install. It also creates inflexibility in an office or classroom layout because, if the arrangement of the desks is to be changed, this requires the connection points to be moved, which is often impracticable.

With present arrangements where PCs and peripheral devices are located on and under the desk, the equipment can readily be damaged, either deliberately or accidentally. It is also easy for the equipment to be vandalized or stolen.

A further difficulty commonly encountered with a PC having at least its associated VDU mounted on a main or secondary desktop of a computer desk is that the VDU takes up valuable desktop space. This space is effectively “dead space” when the PC is not in use and the desk is required for other activities. With at least the VDU on the desktop, a person working or studying at the computer desk has their line of sight obstructed. This is particularly a problem in educational environments where both teacher and pupil can work more effectively if they have a clear line of sight between them. It can also be a problem in office environments as it makes direct communication between co-workers more difficult.

A problem with placing a PC beneath a computer desk so that it does not occupy valuable desk space is that it can be awkward to access the various disk drives of the PC to insert and remove computer software and storage media. This can also make it more difficult to connect/disconnect cables of devices such as headsets or the like.
Another difficulty with current computer desks is the clutter that occurs on the desktop caused by the computer peripherals such as a keyboard and a mouse. This clutter is detrimental to the use of such desks for non-computing activities such as paperwork.

Further, the provision of separate computer desks and general work desks is in most cases impractical and economically unjustifiable.

In the main, the design of computer desk solutions has started from the premise that the PC is the most important work (or learning) tool of its user and therefore the primary function of the computer desk is to support the PC and its peripheral devices, particularly the VDU, in a user friendly manner with little or no consideration being given to the other activities that the user may wish or be required to perform at the desk.

The present invention aims to provide an improved desk and desk system for electronic apparatuses havingVDUs that obviates and/or mitigates disadvantages associated with known computer desks and desk systems.

The present invention also aims to provide an improved desk and desk system for electronic apparatuses having VDUs that allows at least a VDU of such an apparatus to be stowed in a position below a plane of a desktop part of a computer desk in order to obviate the problem of the VDU obstructing a user’s line of sight.

It is a further aim of the present invention to provide an improved desk and desk system that addresses current difficulties by efficiently, effectively, and economically, bringing desk and computer systems and other electronic devices together in networked situations. The desks can be connected together and at the same time the computers can be interconnected to form a network.

Accordingly, in a first aspect the present invention provides a desk for supporting an electronic apparatus having a visual display unit (VDU), said desk comprising a desktop providing a work surface, a mount for supporting at least the VDU in a first position above
the desktop and means connecting the mount to the desktop, wherein said connecting means is operable to move at least the VDU to a second position below the plane of the desktop.

5 The means for connecting the mount to the desktop may comprise a rotatable connector fixed to the desk such that the mount for supporting at least the VDU can be rotated about the connector to move at least the VDU between its first and second positions.

Preferably, the means for connecting the mount to the desktop comprises a means for moving at least the VDU vertically between its first and second positions.

The means for moving at least the VDU between its first and second positions is manually operable and/or actuable.

15 Preferably, the means for moving at least the VDU between its first and second positions is motorized.

Preferably also, the means for connecting the mount to the desktop comprises a cradle connected to the desk, said cradle comprising a housing for containing the VDU when in its second, stowed position.

Preferably further, said desk is adapted to be connected to at least one other desk to form a desk system.

25 The system of interconnected desks forming the desk system may comprise a conference table.

Preferably, the means connecting the VDU mounts to the desks of the system is common to said desks and is operable to move all of the VDUs simultaneously between their respective first and second positions.

Preferably also, said means for connecting the VDU mounts to the desks of the system
comprises a central console enclosed by said desks.

Preferably further, a cover of the central console comprises a part of the single large work surface of the desk system when the central console is in a stowed position.

The means connecting the VDU mounts to the desks of the system may also carry the electronic apparatuses associated with each VDU.

Each of said desks may include a chassis comprising one or more cassettes containing one or more electronics systems; a power distribution system and an electronics connections system, both mounted beneath the desktop and within the chassis and extending from one side of the desktop to another, connectable to at least one cassette and connectable to similar adjacent desks at one or more sides.

In a second aspect, the present invention provides a desk system comprising two or more desks in accordance with the first aspect of the invention interconnected to at least one other desk.

The foregoing and further features of the invention will become more readily apparent from the following description, by way of example therefore, of preferred embodiments of a desk and desk system in accordance with the present invention with reference to the accompanying drawings, of which:

Fig. 1 is a plan view from above of a desk in accordance with a first embodiment of the invention;

Fig. 2 is a plan view from above of the desk of figure 1 with a desktop cover removed;

Fig. 3 is a front view of the desk of figure 1;

Fig. 4 is a side view from the left of the desk of figure 1;
Fig. 5 is a plan view from above of a series of desks of the type shown in figure 1 forming a desk system in accordance with the first embodiment of the invention;

Fig. 6 is a front view of the desk system of figure 5;

Fig. 7 is a plan view from above of a desk in accordance with a second embodiment of the invention;

Figure 8 is a front view of the desk of figure 7;

Figure 9 is a side view from the left of the desk of figure 7;

Fig. 10 is a plan view from above of a series of desks of the type shown in figure 7 forming a desk system in accordance with the second embodiment of the invention;

Fig. 11 is a front view of the desk system of figure 10;

Figure 12a is a perspective view of a desk system in accordance with a third embodiment of the invention showing a central console in a raised position;

Figure 12b is a perspective view of the desk system in accordance with the third embodiment of the invention showing the central console in a retracted position;

Figure 13a is a side view of the desk system in accordance with the third embodiment of the invention showing the central console in its raised position;

Figure 13b is a side view of the desk system in accordance with the third embodiment of the invention showing the central console in its retracted position;

Figure 14a is a side sectional view of the desk system in accordance with the third embodiment of the invention showing the central console in its retracted position;
Figure 14b is a side sectional view of the desk system in accordance with the third embodiment of the invention showing the central console in its raised position;

Figure 15 is a perspective view of a desk system in accordance with a fourth embodiment of the invention;

Figure 16 is a perspective view of a desk system in accordance with a fifth embodiment of the invention;

Figure 17 is a side sectional view of the desk system in accordance with the fifth embodiment of the invention; and

Figure 18 is a perspective view of a two part desk system in accordance with a sixth embodiment of the invention.

Referring to the drawings, in Fig. 1 there is shown a part of a desk system in accordance with a first preferred embodiment of the invention comprising a desk 10. Desk 10 may be connected to a similar desk provided in accordance with the present invention, which may be of the same or a different plan shape to the desk 10 shown in Fig. 1, to form the desk system. The desk 10 has connecting means comprising a connecting recess 13 at one side of the desk 10 and a complementary retaining tooth 14 at another side of the desk 10, said recess 13 and tooth 14 being formed in a main desktop cover 9, such that two similar desks 10 can, when brought into abutment, be interlocked with each other to form a desk system. The main desktop cover 9 provides a desktop surface that can be used as a work surface and/or a device mounting surface of the desk 10. Also shown in Fig. 1 is a bridge unit 11 having a retaining tooth 16 and a complementary connecting recess 15 which can also be used with desks 10 to construct a desk system. As shown in the figure, the retaining tooth 14, 16 and complementary recess 13, 15 may be on opposite sides of the desk 10 or bridge unit 11 or on adjacent sides thereof.

Fig. 2 shows desk 10 with its main desktop work surface part (cover) 9 removed. A chassis 30 of the desk 30 includes a frame 31 formed from metal, for example, defining a
generally rectangular frame unit. Four threaded mounting sockets 32 are cut into frame 31 at its corners to accommodate desk legs 50 which support the desk 10 as a stand-alone unit. The legs 50 can conveniently be threaded at their upper ends and are screw-threadedly fitted into the mounting sockets 32. Where the desk 10 is not utilized as a stand-alone unit, i.e. if two or more desks and/or bridge units 11 are positioned adjacent to each other and interlocked to form a desk system, then only one desk requires all four legs 50 and the remaining linked desks and bridge units 11 each only need two legs 50, with the end of each such desk or bridge unit 11 without legs being supported through its interlocking connection with the next linked desk or bridge unit 11. Alternatively, each alternate desk or bridge unit 10, 11 may have 4 legs with each other interlocking desk or bridge unit located therebetween having no legs and being supported through its interlocking connections to the desks 10 or bridge units 11 adjacent its ends or points of interconnection.

The chassis 30 has an opening at a front side edge thereof through which a PC cassette 37 that contains a central processing unit (CPU) apparatus 45 of a PC can be inserted into the chassis 30 of the desk 10. The cassette 37 includes a disc drive unit 43 which may include one or any combination of a floppy disc drive, a Zip drive, a CD disk drive and other computer storage media read/write devices. In fact, those peripheral devices, switches and/or connectors to which user access is regularly required, such as the floppy and CD disk drives, the power-on switch, some USB ports, headset connection ports and the like are in the main located at the front of the cassette 37 adjacent a desk side at which a user sits. Other components and connectors, such as serial, parallel, and additional USB ports and speaker and headphone connectors, for example, are located at the back of the cassette 37 and are accessed via an access hatch 19 set into the desktop 9. For security purposes, the power-on switch may also be located at the back of the cassette 37 and accessed only through the hatch 19. The cassette 37 is lockable to the chassis 30 by means of a key actuated locking mechanism 39 once the cassette 37 has been fully inserted into the chassis 30.

The front of cassette 37 may conveniently be painted or finished with a powder coated metal fascia 40 or by any other suitable means and the front of the chassis 30 may be
finished with a similar fascia 38. The cassette fascia 40 has appropriate cutouts in it to provide access to disk drives etc. Further, a security cover plate 46 is located in front of the cassette fascia 40 and in one arrangement can be pivoted so that it can be lowered into a position below the cassette 37 to release it. In its raised position, the cover plate 46 is locked into position using the same key actuated locking mechanism 39 as used for locking the cassette 37 to the chassis 30. The cover plate 46 may have the same finish as the fascias 38 and 40 and sits flush with the chassis fascia 38 when in its raised position.

The fabrication and servicing of the cassette 37 itself is made easier by mounting the various drives 43 in a metal cradle 44, which is then easily located into the cassette 37 as a single unit using a minimum number of fixings.

The desk 10 in accordance with the first embodiment of the invention has a 240V electrical supply comprising a system of standard IEC power cables 36 linked together and located beneath the main desktop cover 9. Each cable 36 comprises a male plug at say its left hand end and a female plug at say its right hand end. It will be understood that the description of the cables 36 having certain type of connectors at specified ends as viewed in figure 2 is merely for ease of describing the desk 10 in accordance with the first embodiment of the invention save for the fact that the cables 36 in each desk 10 should be arranged so as to be capable of being interconnected with respective electrical supply cables 36 of adjacent desks 10. The cables of adjacent desks 10 can therefore be interconnected to provide a continuous power circuit through the interlocked desks 10. The power cables 36 are conveniently accommodated within a segregated metal cable channel 42 within the chassis, running along the back of the chassis 30 behind the cassette 37. The channel 42 affords easy installation of the cables 36 and protects them from unauthorized access.

A power supply unit 34 in the cassette 37 provides suitable DC power supplies for the computer components and VDU. The power supply unit 34 is mains powered and is supplied via the power cables 36. Where a TFT (thin film transistor) unit is used as the VDU, the power supply unit 34 can also provide power to the VDU using a spare power channel from said power supply unit. If a cathode ray tube (CRT) unit is used, then a
standard voltage power supply is used and this is supplied either by another cable 36 or a splitter lead from a cable 36.

Access hatch 19 consists of a generally rectangular shaped recess in the desktop 9 and cover 20 having a suitable number of cutouts 18 for accommodating 19 cables of peripheral devices such as a mouse and a keyboard that are normally used on the desktop 9. One side of cover 20 rests on a rim inside access hatch 19 whereas the other end has a tongue that is first introduced into a slot in the edge of the desktop within the access hatch. Pressing the access hatch cover 20 where the rim is not present will therefore cause it to tilt, so that it can be temporarily removed to provide access to the rear of the chassis 30 of the desk 10 behind the cassette 37. The cover 20 can be locked to the desktop using a key-operated locking mechanism 12. Not only does the access hatch 19 provide access to cable connections at the rear of the cassette 37, but it also provides a space to stow the mouse if desired.

The desktop 9 may also have a slot 17 for storing the keyboard when it is desired to clear a larger space on the desktop 9 for general work or study not involving use of the PC.

The PC shown consists not only of a CPU apparatus 45 and a disk drive unit 43 but also a mouse (not shown), a keyboard (not shown) and a VDU 54. The VDU 54 is preferably of a TFT flat screen type located on a mount 51 (Fig. 3) fixed to the desktop 9 towards the center of a rear edge portion thereof. The mount 51 is of a hollow tube construction through which signal and power cables for the VDU 54 can be routed. The mount 51 supports the VDU 54 in a position spaced above the plane of the desktop 9 at a height convenient for viewing by a user of the PC. The mount 51 is connected to the desktop 9 by a rotatable connector 55 that allows the VDU 54, supported on the mount 51, to be moved (as indicated by arrowed line A in figure 4) from a normal in use position (as shown in figures 1, 3 & 4) above the plane of the desktop 9 to a stowed position below the plane of the desktop 9 when not in use. The connector 55 has a clutch mechanism (not shown) that prevents the mount 51 from freely moving relative to the desktop 9 such that manual pressure must be applied to the mount 51 and/or VDU 54 to cause it to move between its in use and stowed positions. The connector 55 therefore enables at least a
VDU 54 of a PC supported by the desk 10 to be stowed out of the line of sight of a user of the desk 10 when the VDU 54 is not in use.

In Figures 5 & 6 there are shown 3 desks 10 in accordance with the first embodiment of the invention with the respective connection recess 13 and retaining tooth 14 of each desk 10 being interlocked to connect the desks to form a desk system in accordance with said first embodiment of the invention. Complementary desk system end pieces 80 and 81 are connected to enclose the free connection recess 13 and retaining tooth 14 at the ends of the desk system to thereby provide straight edges at said free ends for both safety and aesthetic reasons.

Referring now to figures 7 to 11 of the drawings, shown is a second embodiment of a desk for forming a desk system in accordance with the invention. The desk shown in figures 7 to 11 has a similar construction to that of the desk 10 in accordance with the first embodiment of the invention and therefore, in the following description, like numerals to those employed in the description of the first embodiment but preceded by the numeral “10” will be used to denote like parts.

The desk 1010 has connecting means comprising a connecting recess 1013 and a complementary retaining tooth 1014 formed in a desktop cover 109 of the desk 1010 which enable a series of such desks 1010 (and bridge units 1011) to be interconnected as illustrated in figures 10 and 11 to form a desk system in the same manner as described for the first embodiment depicted by figures 1 to 6 of the drawings. A recess hatch 1019 is provided in the desktop 109 to afford access to a rear of a cassette 1037 (figures 8 and 11) containing a CPU apparatus (not shown) and disk drive unit (not shown) etc of a PC inserted into the chassis 1030 of the desk 1010 through an opening in a front side face thereof such that the disk drive unit etc of the PC is easily accessible by a user of the PC sitting at the desk 1010.

In contrast with the first embodiment, however, a VDU 1054 of the PC supported by the desk 1010 is fixed to a mount 1060 which, together with the VDU 1054, can be retracted into a cradle 1062 located to the rear of the desk 1010. The cradle 1062 comprises side
and end walls 1062a,b which form a housing for containing and protecting the VDU 1054 when in its stowed position below the plane of the desktop 109 when not in use. As can be better seen in figure 9 in which a front end wall 1062b of the cradle 1062 has been removed for ease of illustrating the structure of the desk 1010 and said cradle 1062, the VDU 1054 and its mount 1060 can be moved vertically (as indicated by arrowed line B in figure 9) between the VDU’s in use position above the plane of the desktop 109 (as shown in the figure) and its stowed position within the housing. An upper edge portion of a front side wall 1062a of the cradle 1062 is fixed to the chassis 1030 of the desk 1010 thereby securing the cradle 1062 to the desk 1010. A surface of this front side wall facing a user seated at the desk 1010 acts as a kick board to prevent a user from accidentally or otherwise damaging the VDU 1054 when in its stowed position below the plane of the desktop 109. Whilst the cradle 1062 is shown as being suspended above a floor level on which the desk 1010 rests, it will be understood that the housing of the cradle 1062 might also be arranged to rest on the floor thereby reducing the strain on fixings securing the cradle 1062 to the desk 1010. Alternatively, the cradle 1062 may not be fixedly secured to the chassis 1030 of the desk 1010 at all but may comprise a stand-alone unit which rests on the floor. Consequently, the cradle 1062 could be placed in any position adjacent the desk 1010 desired by a user of the PC but such that the VDU 1054 is easily viewable when raised out of the cradle 1062, i.e. the VDU occupies a position above the plane of the desktop 109. The cradle 1062 could even be placed at a side of the desk 1010 where the desk itself is being used as a stand-alone computer desk rather than as part of an interlocking desk system.

Supported between the side walls 1062a of the cradle is a means 1070 for causing vertical movement of the VDU 1054 between its in-use and stowed positions. This may comprise a manually actuated means of the type whereby a user manually applies pressure in a downward direction to the VDU 1054 and/or its mount 1060 against a spring assembly and/or hydraulic cylinder assembly (not shown) biasing the VDU 1054 to its in use position in order to move the VDU 1054 to its stowed position. At its stowed position, the VDU mount 1060 is latched by a latching mechanism (not shown) to retain the VDU 1054 in its stowed position. To return the VDU 1054 to its in use position above the plane of the desktop, the latching mechanism is manually operated to release the mount 1060 and
stored energy of the VDU movement means 1070 causes the VDU 1054 to rise to its in use position. A VDU movement means of this type may comprise a spring and/or hydraulic cylinder assembly as commonly found on office chairs or the like for adjusting the height of a seat of such a chair. It will be understood that the foregoing is but one example of a manually operated VDU movement means 1070 and that any suitable means familiar to a skilled artisan could be utilized as the means of manually moving the VDU 1054 between its in use and stowed positions. Alternatively, the VDU movement means 1070 may be motor driven comprising, as one possibility, a rack and pinion arrangement where the VDU mount 1060 comprises the motor driven rack.

Power and signal cables (not shown) for the VDU 1054 may be routed via a cableway 1064 formed in the upper edge portion of the front side wall 1062a of the cradle and via a port 1060a in the VDU mount 1060. The power and signal cables are routed such that there is sufficient slack to accommodate movement of the VDU 1054 between its in use and stowed positions. This slack can be contained within the housing of the cradle 1062 above the VDU movement means 1070 for protection and safety reasons.

In the second embodiment of the invention as depicted by figures 7 to 11, the VDU 1054 is stowed in a not in use position behind the desk 1010 within a housing whereby the VDU 1054 is protected from being damaged when in said stowed position and unauthorized access to the VDU 1054 and its power and signal cables is at least hindered and whereby the VDU 1054 docs not occupy valuable desktop space when not in use.

Figures 12 to 14 show a desk system in accordance with a third embodiment of the present invention. Each of the desks shown in figures 12 to 14 has a similar construction to that of the desk 10 in accordance with the first embodiment of the invention and therefore, in the following description, like numerals to those employed in the description of the first embodiment but preceded by the numeral “20” will be used to denote like parts.

Each desk 2010 has connecting means comprising a connecting recess 2013 and a complementary retaining tooth 2014 formed in a desktop cover 209 thereof which enable the desks 2010 to be interconnected as illustrated to form a generally hexagonal shaped
desk system arranged around and enclosing a central console unit 2090. Each desk has a recess hatch 2019 in its desktop 209 to afford access to a rear of a cassette 2037 containing a CPU apparatus (not shown) and disk drives (not shown) etc of a PC inserted into the chassis 2030 of the desk 2010 through an opening in a front side face thereof such that the disk drives etc of the PC are easily accessible by a user of the PC sitting at the desk 2010.

In contrast with the desk systems of the first and second embodiments of the invention, the desktops 209 of each desk 2010 and an upper cover 2090a of the central console 2090 comprise between them a single large work surface comprising what might be termed a conference table whereby all users seated at the table so formed are generally facing inwardly towards each other with their lines of sight unobstructed by VDUs or the like. The conference table is formed when the central console 2090 is in its stowed position (figures 12b, 13b and 14a) such that its upper cover 2090a lies in the same plane as the desktops 209 of the desks 2010. Alternatively, the desk system in accordance with this embodiment of the invention comprises a plurality of computer work stations when the central console 2090 is in its in use position (figures 12a, 13a and 14b) revealing VDUs 2054 mounted within the console 2090, at least one VDU 2054 being provided per work station.

Referring to figures 14a and 14b, shown in each case is a cross section of the desk system in accordance with the third embodiment of the invention illustrating a means 2094 for moving the central console 2090 between its in use position (figure 14b) whereby VDUs 2054 mounted in side walls 2094b of the console are positioned above the common plane of the desktops 209 and its stowed position (figure 14a) whereby said VDUs 2054 are located below the plane of the desktops 209 and therefore not obstructing the line of sight of users sitting at the conference table thus provided. The console movement means 2094 is preferably motorized and may comprise a motor driven rack and pinion arrangement as aforesaid or any suitable means of raising and lowering the console including a scissor lift (not shown), a hydraulic and/or pneumatic cylinder arrangement or the like.

The central console 2090 and/or desks 2010 may include kick boards 2095 which protect the VDUs 2054 when the console 2090 is in its stowed position.
Figure 15 show a desk system in accordance with a fourth embodiment of the present invention. Each of the desks shown in figure 15 has a similar construction to that of the desk 10 in accordance with the first embodiment of the invention and therefore, in the following description, like numerals to those employed in the description of the first and other embodiments but preceded by the numeral “30” will be used to denote like parts.

Each desk 3010 has connecting means comprising a connecting recess 3013 and a complementary retaining tooth 3014 formed in a desktop cover 309 thereof which enable the desks 3010 to be interconnected as illustrated to form a generally oval shaped desk system arranged around and enclosing a central console unit 3090 in a similar manner to the desk system of the third embodiment depicted by figures 12 to 14. Each desk 3010 has a recess hatch 3019 in its desktop 309 to afford access to a rear of a cassette 3037 containing a CPU apparatus (not shown) and disk drives (not shown) etc of a PC inserted into the chassis of the desk 3010 through an opening in a front side face thereof such that the disk drives ctc of the PC are easily accessible by a user of the PC sitting at the desk 3010.

In contrast with the desk systems of the first and second embodiments but similarly to the desk system of the third embodiment of the invention, the desktops 309 of each desk 3010 and an upper cover 3090a of the central console 3090 comprise between them a single large work surface comprising a conference table whereby all users seated at the table so formed are generally facing inwardly towards each other with their lines of sight unobstructed by VDUs or the like. The conference table is formed when the central console 3090 is in its stowed position such that its upper cover 3090a lies in the same plane as the desktops 309 of the desk 3010. Alternatively, the desk system in accordance with this embodiment of the invention comprises a plurality of computer work stations when the central console 3090 is in its in use position (as illustrated in figure 15) revealing VDUs 3054 mounted within the console 3090, at least one VDU 3054 being provided per work station.

To form the generally oval shaped conference table as illustrated in figure 15, the desks
3010 are not directly interlocked but interconnected by intermediary desk connecting pieces (bridge units) 3096 and desk end connecting pieces 3098, each of which has, as appropriate, a connecting recess 3015 and complementary retaining tooth 3016.

Figures 16 and 17 show a desk system in accordance with a fifth embodiment of the present invention. The desk system of this embodiment is generally the same as that of the fourth embodiment so like numerals will be employed to denote parts. However, the desk system of this embodiment has PCs 3099, in addition to VDUs 3054, mounted in side walls 3090b of the central console 3090. These PCs 3099 may be in addition to or replacement of the PCs mounted in the desks 3010. In the case where the PCs 3090 replace those mounted in the desks 3010, this provides the advantage that the PCs 3099 are not accessible at all when the console 3090 is in its stowed position the PCs 3099 and VDUs 3054 locate behind kick boards 3095 of the desks 3010.

Referring now to figure 18, illustrated is a two part desk system in accordance with a sixth embodiment of the invention. The desk system as depicted in figure 18 differs from the desk systems in accordance with the first to fifth embodiments in that it comprises a single desk unit 4010 in the form of a conference table or the like whereby users seated at the table generally face inwardly towards each other. The desk unit 4010 has a desktop cover 409 providing a convenient work surface for users seated at the table. The desk unit 4010 may be provided solely for use as a conference type table. However, the desktop cover 409 of the desk unit 4010 is provided with a removable central cover part 409a which generally encloses a central well of the desk unit 4010. The cover part 409a can subsequently be removed to enable a stand-alone console assembly 4090 (as illustrated in the upper part of figure 18) to be located into the central well to convert the conference table into a dual purpose conference table/PC work station unit. The stand-alone console assembly 4090 comprises a housing 4090c containing a console unit 4090d which is mounted within the housing for movement vertically between a stowed position in which its upper surface 4090a preferably lies in the same plane as the desktop 409 of the desk unit 4010 and an in use position at which PCs 4099 and VDUs 4054 are accessible to users seated at the desk unit 4010. The console assembly 4090 includes means (not shown) as used in other embodiments of the invention for causing the console unit 4090c to move
between its in use and stowed positions. The central cover part 409a of the desk unit 4010 may be fixed to an upper part of the console assembly 4090 to form the upper cover 4090a of said console assembly 4090. Thus, this embodiment of the invention provides in effect a single (stand-alone) outer desk unit and a single (stand-alone) inner PC work station unit whereby the inner PC work station unit can be provided separately and subsequently to the desk unit to upgrade the desk unit’s function from merely that of a conference table or study desk for multiple users to a conference table/multi-station PC work unit.

Whilst the embodiments of the invention have been described with reference to an electronic apparatus comprising a PC, it will be understood that the electronic apparatus supported in a desk system in accordance with the invention could comprise any electronic apparatus having a VDU.

In summary, a desk for supporting an electronic apparatus having a VDU and a desk system formed by interconnecting a plurality of such desks or as a separate unit is provided. Each desk either individually or as a means common to all desks has means for moving at least a VDU of said electronic apparatus from a first in use position above a plane of a desktop work surface to a second, stowed position below the plane of the work surface. The desk and desk system thereby address the problem encountered with known computer desks of at least the VDU occupying valuable desk space when not in use and/or obstructing a user of the desk’s line of vision.
Claims:

1. A desk for supporting an electronic apparatus having a visual display unit (VDU), said desk comprising a desktop providing a work surface, a mount for supporting at least the VDU in a first position above a plane of the desktop and means for placing the mount adjacent the desktop, wherein said placement means is operable to move at least the VDU to a second position below the plane of the desktop.

2. A desk as claimed in claim 1, wherein the placement means comprises means for connecting the mount to the desktop.

3. A desk as claimed in claim 2, wherein the connecting means comprises a rotatable connector fixed to the desk such that the mount for supporting at least the VDU can be rotated about the connector to move at least the VDU between its first and second positions.

4. A desk as claimed in claim 1, wherein the means for placing the mount adjacent the desktop comprises a means for moving the mount vertically thereby enabling at least the VDU to be moved vertically between its first and second positions.

5. A desk as claimed in claim 4, wherein the means for moving the mount vertically to enable at least the VDU to be moved vertically between its first and second positions is manually operable and/or actuable.

6. A desk as claimed in claim 4, wherein the means for moving the mount vertically is motorized.

7. A desk as claimed in any of claims 4 to 6, wherein the means for placing the mount adjacent the desk comprises a cradle having a housing for containing the VDU when in its second, stowed position.

8. A desk as claimed in claim 7, wherein the cradle is fixedly secured to the desk.
9. A desk as claimed in any of claims 1 to 8, wherein said desk is adapted to be interlocked with at least one other desk to form a desk system.

10. A desk as claimed in claim 9, wherein the system of interlocked desks forming the desk system comprises a conference table.

11. A desk as claimed in claim 9 or 10, wherein the means for placing VDU mounts adjacent respective desks of the system is common to all said desks and is operable to move all of the VDUs simultaneously between their respective first and second positions.

12. A desk as claimed in claim 11, wherein said common means for placing the VDU mounts adjacent respective desks of the system comprises a central console enclosed by said desks.

13. A desk as claimed in claim 12, wherein a cover of the central console comprises a part of a single large work surface of the desk system when the central console is in a stowed position.

14. A desk as claimed in any of claims 11 to 13, wherein the common means for placing the VDU mounts adjacent respective desks of the system also carries the electronic apparatuses associated with the VDUs.

15. A desk as claimed in claim 14, wherein the electronic apparatuses associated with the VDUs comprise PCs.

16. A desk as claimed in any of claims 1 to 15, wherein each of said desks includes a chassis comprising one or more cassettes containing one or more electronics systems; a power distribution system and an electronics connection system, both mounted beneath the desktop and within the chassis and extending from one side of the desktop to another, connectable to at least one cassette and connectable to similar adjacent desks at one or
more sides.

17. A desk as claimed in claim 16, wherein at least one face of a cassette is located adjacent the desktop side at which a person works at the desk such that the cassette or one or more ports in the cassette are accessible to that person.

18. A desk as claimed in claim 16 or claim 17, wherein the cassette/s are located under the desktop.

19. A desk as claimed in any one of claims 16 to 18, wherein the cassette is removably mounted to the desktop.

20. A desk as claimed in any one of claims 16 to 19, wherein the cassette is mounted within the chassis.

21. A desk as claimed in any one of claims 16 to 20, wherein the underside of the desktop is recessed to accommodate part or all of the cassette and components contained therein.

22. A desk as claimed in any one of claims 16 to 21, wherein the desktop top face extends over the top of at least most of the cassette and components contained therein.

23. A desk as claimed in any one of claims 16 to 22, wherein it includes connecting means at at least one edge of the desktop for interlocking with an adjacent desk or bridge unit.

24. A desk as claimed in any one of claims 16 to 23, wherein power and electronics cables are generally located beneath the desktop in the chassis.

25. A desk as claimed in any one of claims 16 to 24, wherein the chassis comprises a segregated metal cable channel running from adjacent one side of the desk to another side of the desk behind the cassette/s.

26. A desk as claimed in any one of claims 16 to 25, wherein power cables, network
and communications systems cables extend from cable connecting means adjacent one side of the desk that is to be connected to another desk to cable connecting means located adjacent another side of the desk, and the connecting means enable easy connection of the cables of adjoining desks, thus creating a continuous power circuit supplying adjoining desks and also a continuous electronics network and communications circuit.

27. A desk system comprising two or more desks as claimed in any of claims 1 to 26, said desks being interlocked to form the desk system.

28. A desk system as claimed in claim 27, further comprising at least one bridge unit interlocking two of the desks.

29. A desk system for supporting a plurality of electronic apparatuses having visual display units (VDUs), said desk system comprising: a desk unit enclosing a central well, said desk unit having a desktop providing a work surface; and a console assembly located within the central well, said console assembly comprising a console unit movable vertically with respect to said desk unit between first and second positions thereof, said console unit supporting at least the VDUs, wherein, when the console unit is in its first position, at least the VDUs are positioned above a plane of the work surface and, when said console unit is in its second position, at least the VDUs are positioned below the plane of the work surface.

30. A desk system as claimed in claim 29, wherein means for moving the console unit vertically between its first and second positions is motorized.

31. A desk system as claimed in claim 29 or 30, wherein the desk system comprises a conference table.

32. A desk system as claimed in any of claims 29 to 31, wherein the console unit supports the electronic apparatuses and VDUs wherein, when the console unit is in its first position, the electronic apparatuses and VDUs are accessible to users seated at the desk unit and, when said console unit is in its second position, the electronic apparatuses and
VDUs are not accessible to said users.

33. A desk system as claimed in any of claims 29 to 32, wherein the electronic apparatuses comprise PCs.

34. A desk system as claimed in claim 32 or 33, wherein said desk system comprises an assembly of a stand-alone desk unit and a stand-alone console assembly.

35. A desk system as claimed in any of claims 29 to 43, wherein a cover of the console unit comprises a part of a single large work surface of the desk system when the central console is in its second, stowed position.

36. A desk system as claimed in claim 35, wherein the cover of the console unit comprises a removable part of the desk unit desktop.
Application No: GB0413496.1  Examiner: Gareth Jones
Claims searched: 1 - 28  Date of search: 20 August 2004

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

<table>
<thead>
<tr>
<th>Category</th>
<th>Relevant to claims</th>
<th>Identity of document and passage or figure of particular relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>1-5</td>
<td>JP2000102425 A (IF PLANNING) See WPI abstract. Accession No- 2000-332114[29]</td>
</tr>
<tr>
<td>X</td>
<td>1-, 5,7,8,29,32,35</td>
<td>DE10153492 A1 (VER SPEZIALMOEYEBELFABRIKEN GMBH) See WPI abstract. Accession No 2003-383381[37]</td>
</tr>
<tr>
<td>X</td>
<td>1,4-8,16-18,20,21,24</td>
<td>US2002/0101139 A1 (LEE) See paras 0007-0021 inc. See all figs esp 2-4.</td>
</tr>
<tr>
<td>X</td>
<td>1-3</td>
<td>DE20302574 U1 (BORTOLAMEDI) See WPI abstract. Accession No 2003-484757[46]</td>
</tr>
</tbody>
</table>

Categories:

| X | Document indicating lack of novelty or inventive step |
| V | Document indicating lack of inventive step if combined with one or more other documents of same category. & Member of the same patent family |
| A | Document indicating technological background and/or state of the art |
| P | Document published on or after the declared priority date but before the filing date of this invention |
| E | Patent document published on or after, but with priority date earlier than, the filing date of this application |

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC: A4L
Worldwide search of patent documents classified in the following areas of the IPC: 07

An Executive Agency of the Department of Trade and Industry
A47B

The following online and other databases have been used in the preparation of this search report:

EPODOC, JAPIO, WPI